

Research Report 1495

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Academic Skills of U.S. Army Non-Commissioned Officers

Joan Harman, Sally A. Bell, Darla C. Sneed, and Mark A. Sabol



Technologies for Skill Acquisition and Retention
Training Research Laboratory



U.S. Army
Research Institute for the Behavioral and Social Sciences

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<p>At the request of the Commander, Training and Doctrine Command, ARI researchers administered tests to soldiers attending (NCO) Academies at TRADOC sites in order to determine their academic skill levels. On the average, these soldiers read at the 11.0 grade level and perform at the 9.9 grade level in mathematics. These findings will become part of ARI's research program concerning academic skills of NCOs and can be used by the TRADOC Commander to make decisions about basic skills training programs for NCOs. <i>Keywords: Academic competencies, Army personnel, Army research, Army training, Education. (Six)</i></p>					
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Officers**

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FOREWORD

The Technologies for Skill Acquisition and Retention Technical Area of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) performs research and development in education as part of its work program. A major focus of this research is the development of information on which the Department of the Army can base decisions about its basic skills education programs. The research described in this report was conducted under Project A794, Education and Training, as part of Task 311, Improving Job Skills Education for Soldiers.

This report describes research carried out at the request of the Commander, Training and Doctrine Command (TRADOC). The Commander asked ARI to determine basic academic skill levels of soldiers attending TRADOC NCO Academies. ARI researchers tested soldiers at four sites and Education Center staff members tested soldiers at two sites. Data analysis revealed that, on the average, these soldiers read at the 11.0 grade level and perform at the 9.9 grade level in mathematics. However, 13% of these soldiers scored below 9th grade level in reading and about 35% scored below that level in mathematics. These findings will become part of ARI's body of research on improving the academic skills of noncommissioned officers, and the TRADOC Commander can use the results to make decisions about implementing programs to improve these skills.

The research activities described in this report were supported by the Soldier Education Division, Total Army Personnel Agency, Office of the Deputy Chief of Staff for Personnel. The Deputy Commander, TRADOC, was briefed about these research results on 5 July 1988.



EDGAR M. JOHNSON
Technical Director

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We wish to express our gratitude to the NCO Academy Commandants and the Education Services Officers and their staff members for the cordial and cooperative manner in which they supported this research. Special thanks are extended to Mr. Charles Adimaro and Mr. Olin McGill, who administered and scored tests at their posts, and to MAJ(P) Zenola B. Blanding, who provided invaluable support for coordinating and conducting testing.

ACADEMIC SKILLS OF U.S. ARMY NON-COMMISSIONED OFFICERS

EXECUTIVE SUMMARY

Requirement:

The Commander, Training and Doctrine Command (TRADOC), asked the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) to determine the reading grade levels of soldiers attending classes at TRADOC NCO Academies. His objective was to ascertain whether these soldiers needed special intervention to enhance their basic academic skills.

Procedure:

ARI researchers administered the Tests of Adult Basic Education (TABE) Form D to soldiers at Forts Benning, Leonard Wood, Knox, and Sill. Education Center staff members tested soldiers at Forts Dix and Gordon. The TABE tests fundamental reading and mathematics skills and is the standard test used by the Army to determine soldiers' academic skill levels. A total of 1,346 soldiers were tested. ARI researchers scored the tests and then compiled and analyzed the data.

Findings:

On the average, soldiers enrolled at TRADOC NCO Academies read at the 11.0 grade level and perform at the 9.9 grade level in mathematics. These results are consistent across all variables analyzed (rank, combat group, and Academy class). About 13% of the soldiers enrolled in Academy classes scored below the 9th grade level in reading and about 35% scored below the 9th grade level in mathematics.

Utilization of Findings:

ARI will incorporate these findings into its research on improving the academic skills of NCOs. The TRADOC Commander can use these data to make decisions about programs that will enhance NCOs' basic academic skills.

ACADEMIC SKILLS OF U.S. ARMY NON-COMMISSIONED OFFICERS

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ACADEMIC SKILLS OF U.S. ARMY NON-COMMISSIONED OFFICERS

BACKGROUND

The Army has long been aware that some otherwise competent soldiers are deficient in academic skills (reading, writing, listening, and oral communication). These deficiencies tend to impede training, job performance, and career progression. According to Duffy (1985), "Armed forces personnel must operate and maintain some of the most sophisticated, costly, and dangerous equipment in existence. Because of both the complexity of this equipment and the massive number of personnel who must be trained each year, literacy is perhaps more critical in the armed forces than in any other segment of our society." Therefore, as more technologically complex weapons and equipment are added to the Army's inventory, the greater is the burden on the Army to ensure that soldiers are adequately equipped with basic academic skills. This is particularly true for Non-commissioned Officers (NCOs) because they are responsible for conducting training. As Sergeants' Business (1986) points out, "An NCO's ability to learn, teach, train, mentor, solve problems, act independently, have and inspire confidence, and motivate others are all dependent on . . . basic educational skills."

In addition to ever increasing job complexity, a factor that further exacerbates the concern about basic skills is an expected decline in available manpower. Demographic projections to the year 2000 predict a substantial decrease in the prime accession age group during the next decade (Oxford-Carpenter, Pol and Gendell, 1983; Bureau of the Census, 1983/84; Sticht and Mikulecky, 1984; Binkin, 1986). This reduction in the recruitment pool can be expected to result in pressure to lower recruitment standards, thus increasing the gap between job demands and basic skill levels. Clearly, then, the Army must take immediate steps to identify basic skills requirements for success in training, job performance and career development, and provide programs to meet these needs.

In January 1988, the Commander, Training and Doctrine Command (TRADOC), asked the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) to determine the reading grade levels of soldiers attending classes at NCO Academies at TRADOC Army posts. The objective was to learn whether NCOs' basic academic skill levels are adequate to perform their complex and demanding jobs. We coordinated this research with the Soldier Education Division, Office of the Deputy Chief of Staff for Personnel; the Enlisted Training Directorate, TRADOC; Education Centers at TRADOC sites; Office of the Army Continuing Education System, TRADOC; and

Commandants of the NCO Academies. The remaining sections of this report describe the method by which ARI researchers gathered the requested data and the results of that effort.

METHOD

Subjects

1346 soldiers were tested during 1988. ARI researchers administered tests to soldiers at Forts Benning, Sill, Knox and Leonard Wood. Education Center staff members administered tests at Forts Dix and Gordon. The soldiers who participated in the testing were not a carefully selected random sample. They were soldiers who were attending classes at the Academies at the time testing was scheduled. Commandants, however, made every effort to schedule testing at times when the maximum numbers of soldiers were available. While making coordination visits to the Academies, we interviewed Deputy Commandants and S-3s about the academic skills of their students.

Testing Instrument

The Test Control Officer at the Ft. Myer Education Center trained ARI staff members in administration of the Tests of Adult Basic Education (TABE) Form D (Difficult) for this research. We selected this test because it is used routinely by Army Education Centers to screen soldiers for basic skills instruction. It yields grade levels in fundamental reading and mathematics skills and includes sections covering vocabulary, paragraph comprehension, computation, mathematics concepts and problems, capitalization, punctuation, standard English language expression, and spelling. Each segment of the test is very carefully timed, and grade level scores can range from the lowest possible TABE Level D score of 5.0 to the highest possible score, 12.9. At sites at which ARI researchers administered tests, Education Centers lent Examiners' Manuals and test booklets and provided answer sheets. ARI researchers scored the tests and then compiled and analyzed the data.

RESULTS

In the most general terms, the mean grade levels for the entire sample are 11.0 for reading and 9.9 for mathematics. Table 1 shows overall mean grade level scores in total reading and total mathematics, as well as in the TABE subtests. The abbreviated headings stand for Vocabulary, Paragraph Comprehension, Computation, Concepts & Problems, Mechanics &

Expression, and Spelling. The scores range from the lowest possible grade level in the test, 5.0, to the highest possible grade level in the test, 12.9.

Table 1

Overall Grade Level Scores

	VOC	PARA COMPR	TOTAL READING	COMPU	CONC& PROB	TOTAL MATH	MECH& EXPRESS	SPELL
Mean	11.7	10.6	11.0	9.6	10.3	9.9	9.8	9.8
SD	1.8	3.2	1.8	2.2	2.0	2.0	2.3	2.5
Median	12.9	10.8	11.2	9.3	10.2	9.7	9.8	9.9

n = 1346

This Table demonstrates two notable phenomena. First, so many soldiers achieved the maximum score in the Vocabulary subtest that the median score is 12.9. Second, the Computation subtest scores depressed the mean for Total Mathematics. From our experience with scoring TABEs, we observed that, in this very precisely timed test, many soldiers were unable to complete the Computation section. That is, the lower scores were less a result of errors in basic arithmetic functions than of the inability to perform these functions as rapidly as the test called for. The soldiers achieved higher scores in the section of the test--Concepts & Problems--that depends more on reasoning and problem solving. The implication is that these soldiers may have more competency in mathematics than the Computation scores suggest.

Because soldiers recorded their Military Occupational Specialties on their answer sheets, we were able to separate test subjects into Combat Arms, Combat Support and Combat Service Support categories. Figure 1 compares these categories for Total Reading and Total Mathematics. Mean scores for all three groups are at about the same levels. Table 2 shows mean scores for the subtests, again showing similarity across groups and little variability. (All instances in which the n does not equal 1346 can be accounted for by soldiers' failure to fill in information on answer sheets).

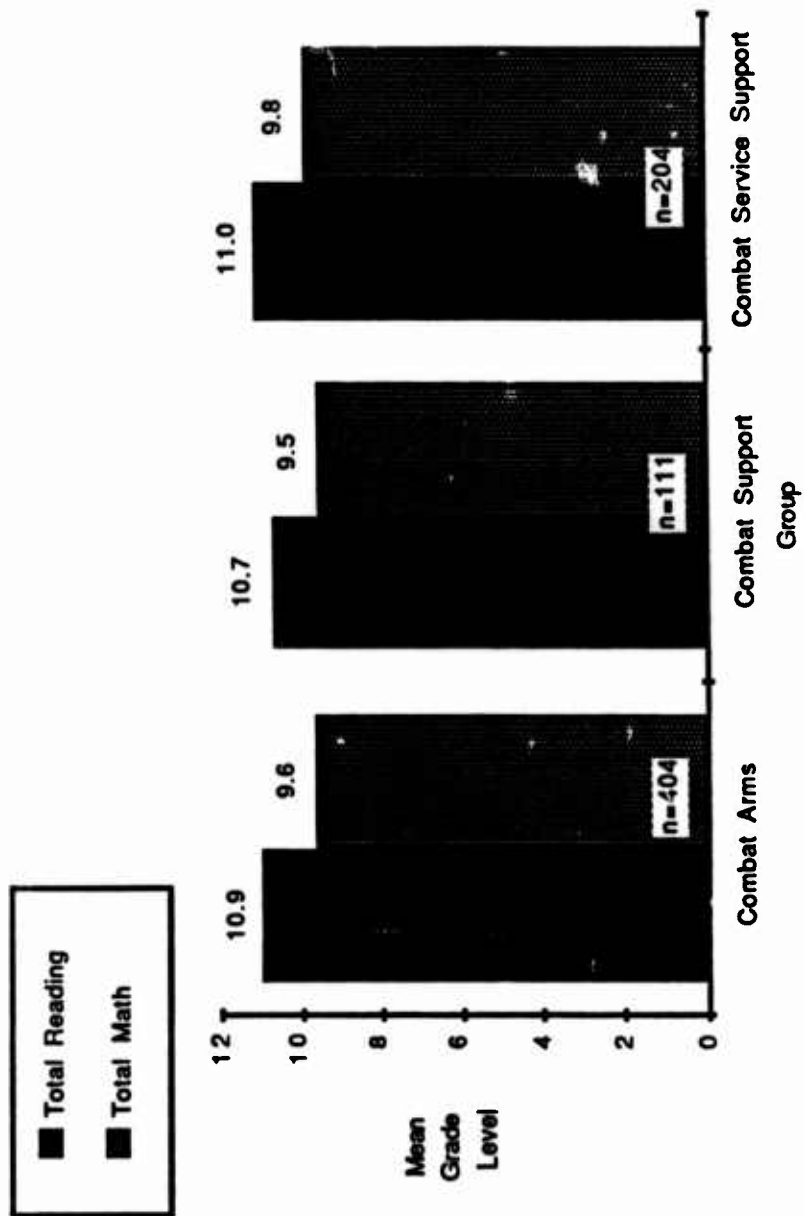


Figure 1. Total Reading and Total Math by Combat Group

Table 2

Grade Level Scores by Combat Group

		PARA VOC	TOTAL COMP	READING	COMPU	CONC& PROB	TOTAL MATH	MECH& EXPRES	SPELL
Combat Arms n=404	Mean	11.7	10.5	10.9	9.3	10.1	9.6	9.3	9.8
	SD	1.8	4.9	1.8	2.2	2.0	2.0	2.4	2.5
Combat Support n=111	Mean	11.3	10.3	10.7	9.0	10.0	9.5	9.7	9.6
	SD	1.8	1.9	1.8	3.6	5.5	1.8	2.0	2.7
Combat Service Support n=204	Mean	11.6	10.5	11.0	9.5	10.3	9.8	9.7	10.2
	SD	1.7	1.9	1.7	2.0	1.9	1.9	2.4	2.4

At four Army posts, Forts Benning, Knox, Leonard Wood and Sill, NCO Academies offered all three training courses--Primary Leadership Development Course (PLDC), Basic Non-commissioned Officer Course (BNCOC), and Advanced Non-commissioned Officer Course (ANCOC). Fort Dix offers only PLDC and Fort Gordon offers only BNCOC and ANCOC. Figure 2 shows mean scores for Total Reading and Total Mathematics by class. Table 3 shows the subtest scores.

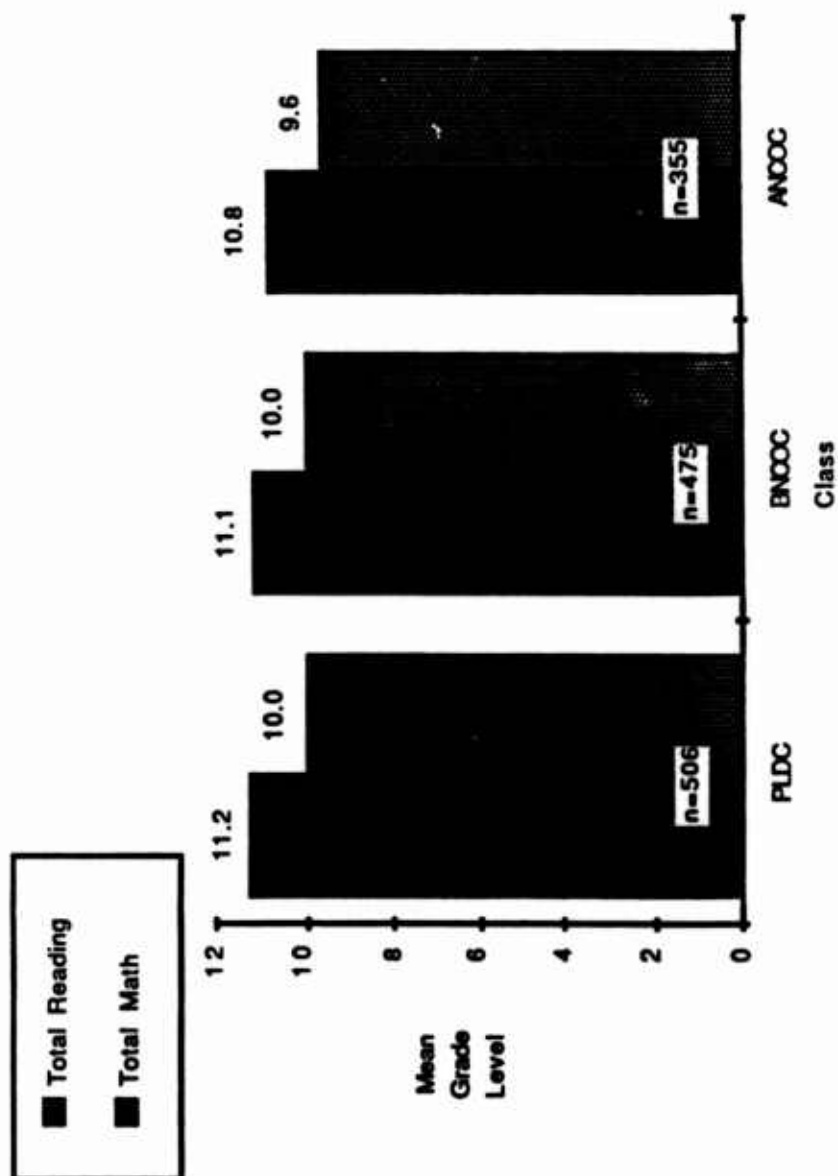


Figure 2. Total Reading and Total Math by Class

Table 3

Grade Level Scores by Class

		PARA VOC	TOTAL COMP	READING	COMPU	CONC& PROB	TOTAL MATH	MECH& EXPRES	SPELL
PLDC	Mean	11.9	10.8	11.2	9.6	10.5	10.0	10.1	10.1
	SD	1.7	2.2	1.7	2.1	2.0	1.9	2.2	2.5
BNCOC	Mean	11.3	10.6	11.1	9.6	10.1	10.0	9.8	9.6
	SD	2.9	2.7	1.9	2.6	4.1	2.0	2.2	2.6
ANCOC	Mean	11.6	10.1	10.8	9.4	9.8	9.6	9.2	9.8
	SD	1.9	2.2	1.9	2.3	2.1	2.2	2.4	2.5

Once again, there are no dramatic differences among classes. All classes are performing at about the same level.

Figure 3 shows comparisons by rank. E-4 is equivalent to an Army Corporal, E-5 to a Sergeant, E-6 to a Staff Sergeant and E-7 to a Sergeant First Class. Table 4 shows mean subtest scores and the percentage that each rank contributed to the sample.

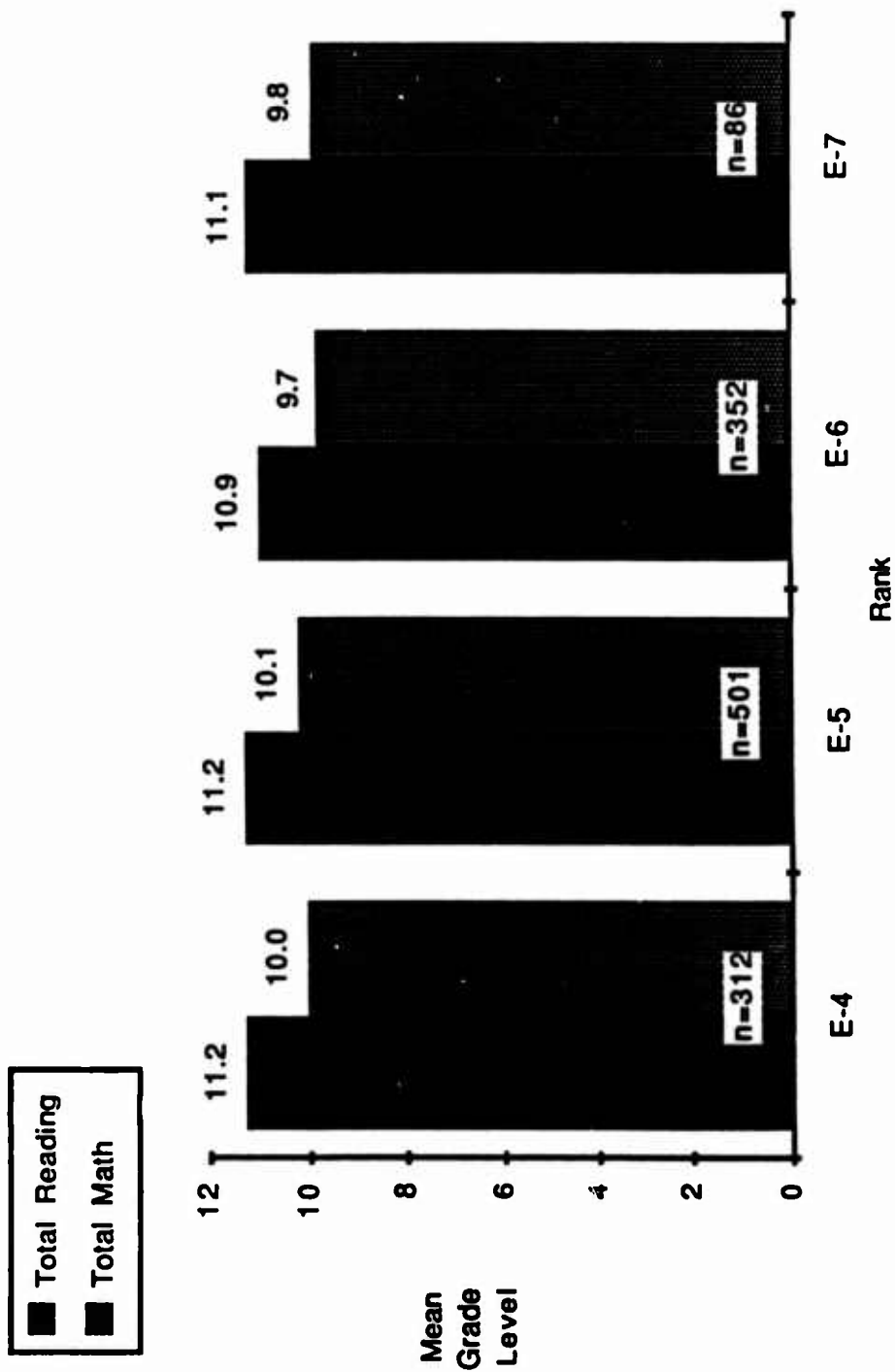


Figure 3. Total Reading and Total Math by Rank

Table 4

Grade Level Scores by Rank

		PARA VOC	TOTAL COMP	READING	COMPU	CONC& PROB	TOTAL MATH	MECH& EXPRES	SPELL
E-4	Mean	11.6	10.8	11.2	9.6	10.2	10.0	10.2	9.6
25%	SD	1.6	1.9	1.6	2.0	1.9	1.8	2.1	2.4
E-5	Mean	11.5	10.7	11.2	9.7	10.3	10.1	9.8	9.8
40%	SD	1.9	3.7	1.9	3.1	4.3	2.0	2.2	2.5
E-6	Mean	11.6	10.4	10.9	9.6	10.1	9.7	9.3	9.6
28%	SD	1.8	2.0	1.8	2.3	2.1	2.1	2.3	2.5
E-7	Mean	11.8	10.4	11.1	9.5	10.0	9.8	9.7	10.3
7%	SD	1.8	2.4	1.9	2.4	2.3	2.3	2.6	2.5

This table shows a high degree of similarity of performance across ranks. What is remarkable is the similarity of the scores of the E-7 soldiers to the other ranks when they constituted so small a percentage of the total sample.

Until very recently, the Education Centers at Forts Gordon and Knox administered the TABE to all soldiers who attended classes at the NCO Academies. They were willing to share these data with ARI. Figures 4 and 5 compare mean grade level scores with the 1988 data. These charts show a tendency for scores to rise over time. This tendency is compatible with Army Education Centers' recognition that, in recent years, soldiers entering the Army have higher levels of basic skills. It seems quite reasonable to expect this to be reflected in the NCO ranks.

Figures 6 and 7 show the number of soldiers with test scores at each grade level of the TABE Form D for Total Reading and Total Mathematics. Table 5 shows the percent of soldiers with scores at each grade level on the subtests.

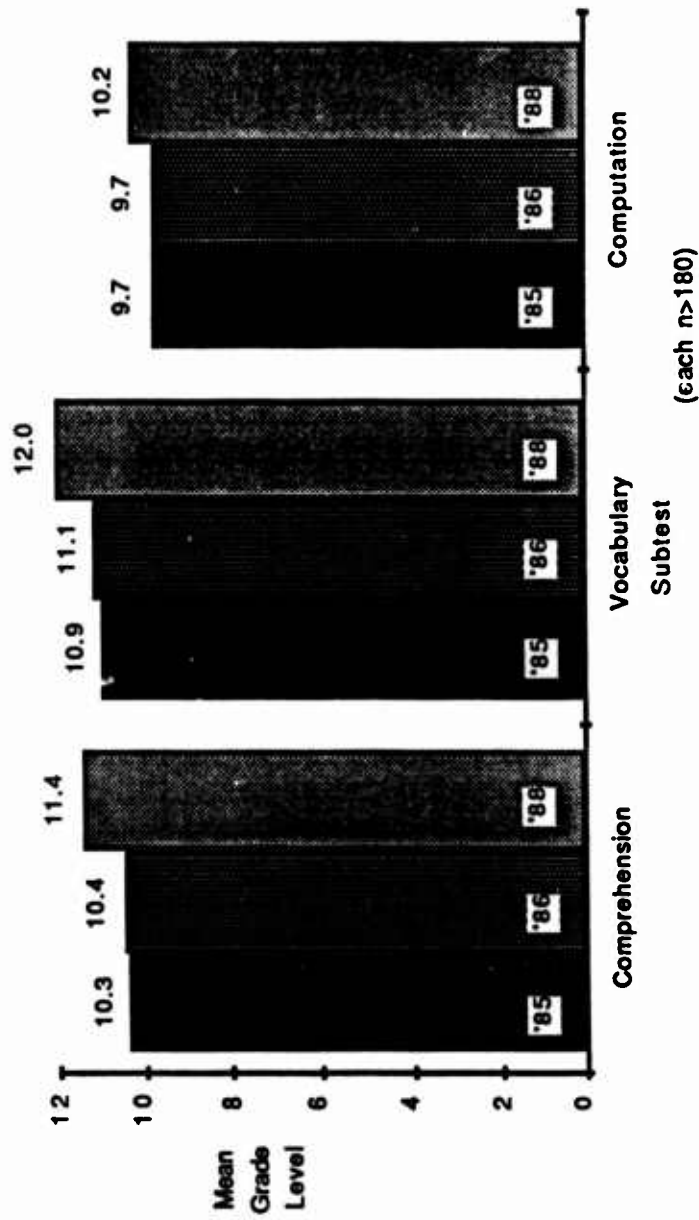


Figure 4. Paragraph Comprehension, Vocabulary, and Computation by Year
FORTGORDON
(each n>180)

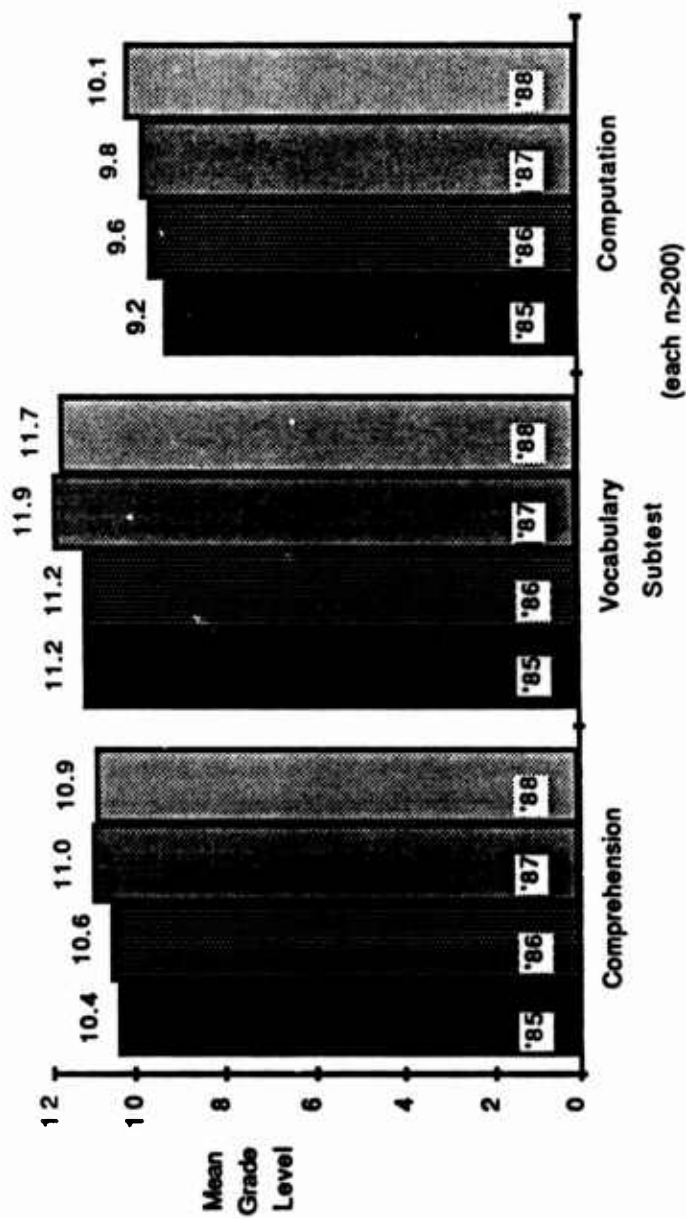


Figure 5. Paragraph Comprehension, Vocabulary, and Computation by Year
FORT KNOX

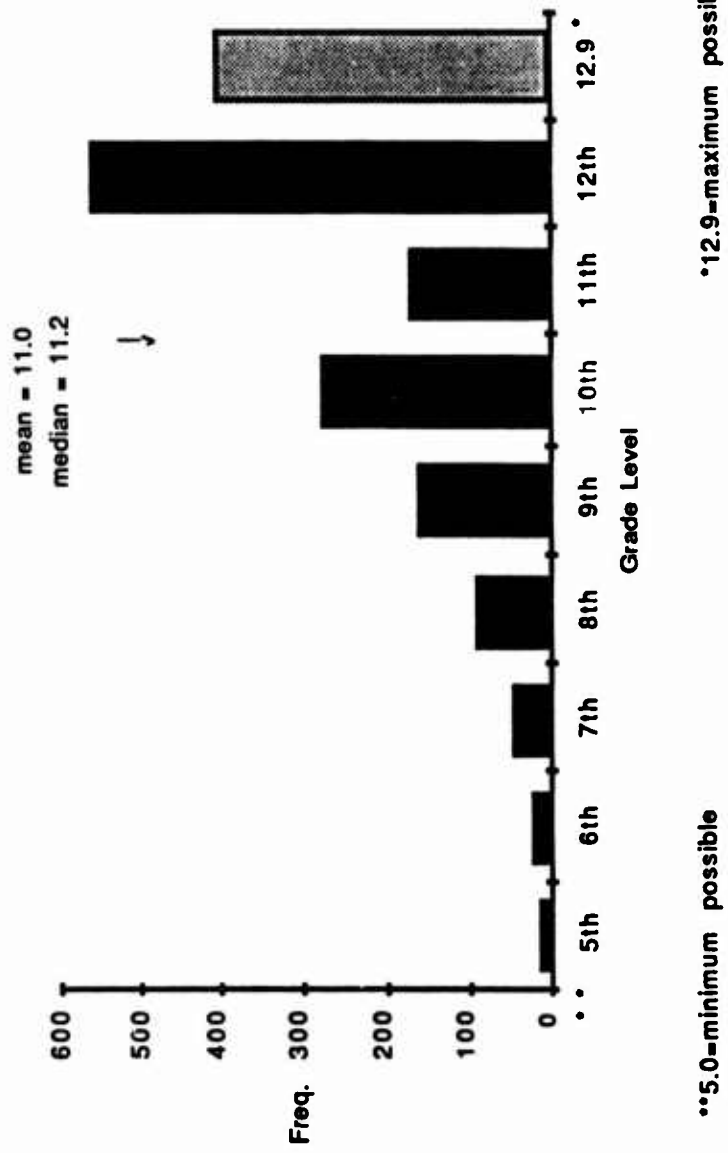
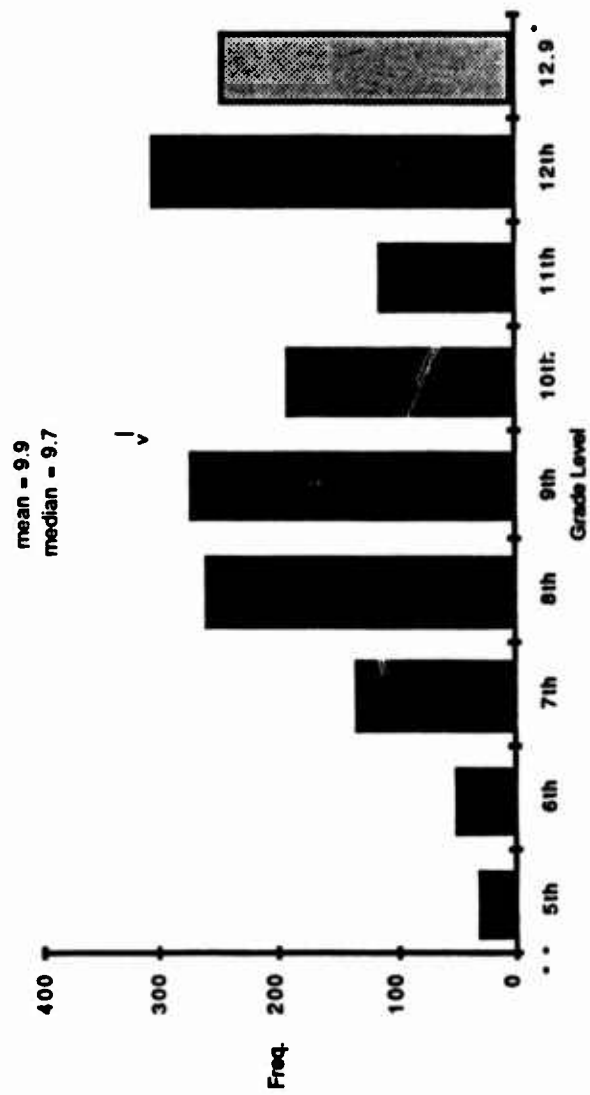


Figure 6. Total Reading Frequency Distribution



*12.9-maximum possible

**5.0-minimum possible

Figure 7. Total Math Frequency Distribution

Table 5

Percent of Soldiers at each Grade Level

GRADE LEVEL	VOC	PARA COMP	COMPU	CONC& PROB	MECH& EXPRES	SPELL
5.0-5.9	1.0	4.1	4.3	2.4	5.8	8.6
6.0-6.9	1.2	1.1	5.0	2.4	5.6	5.5
7.0-7.9	3.8	5.4	11.5	8.7	9.3	12.2
8.0-8.9	4.5	14.5	19.5	15.0	15.8	13.0
9.0-9.9	7.1	12.4	21.0	19.5	12.8	11.0
10.0-10.9	9.2	15.7	14.1	11.5	15.5	12.2
11.0-11.9	17.4	10.8	3.5	11.5	9.4	7.1
12.0-12.9	56.5	35.7	21.3	28.0	26.3	30.1

Both the charts and the table show that scores, especially in reading, tend to pile up at the high end of the distribution. In fact, so many scores at the 12th grade level were the highest possible scores, we included a separate bar at the end of each chart to demonstrate that most of the 12th grade scores were 12.9. The 12.9 grade level is equivalent to Mental Category 2, and this is a considerably higher Category than is mandatory for enlisted personnel.

In terms of target grade levels, the Army has used the 9th grade level as the lowest acceptable basic skill level for enlisted soldiers for a substantial number of years. Clearly, most of the soldiers who participated in this research exceeded this level and a disproportionate number achieved the highest possible test score. However, 13.2% scored below 9th grade level in Total Reading and 34.8% in Total Mathematics. It was soldiers in

these categories who were discussed with Academy Deputy Commandants and S-3s during our coordination visits.

Academy staff members reported that academic deficiencies are not a major problem and that attrition rates from the Academies for any reason are very low. When soldiers demonstrate academic shortcomings, the Academies tend to deal with them in similar ways. First, Army regulations permit soldiers who fail tests that are part of the programs of instruction to retake alternate forms of the tests on two succeeding occasions. Then, between test failure and the next test administration, instructors work very closely with their students to ensure that the failed subject matter is mastered. At one Academy, peer instructors are used for this purpose. These tutoring sessions are scheduled for the evening study period so that classes are not disrupted by the special requirements of these soldiers. This system has been quite successful. However, every staff member interviewed said that he would prefer that all soldiers report to the Academies equipped to keep up with their peers. There is very little extra time in their programs for the students to catch up if they are falling behind. Given a choice, they would like the soldiers who need it to receive preparatory instruction at their units before reporting to the Academy.

DISCUSSION

The Army requires enlisted soldiers to have sufficiently high levels of basic skills to do their jobs. For the majority of the soldiers who participated in this research, the Army can feel confident that they will not experience curtailed careers because of academic deficiencies. A large proportion of those attending classes at the NCO Academies achieved the maximum possible test score on the TABE, and this equates with a mental category well above the cutoff level for enlisted troops.

A small percentage of soldiers tested--those with grade levels lower than 9-- would benefit from intervention to improve their basic skills. The Army, then, would not risk losing otherwise valuable soldiers who need instruction to refresh unused skills or to instill unlearned skills. An investment now in developing programs for NCOs' academic competencies would have an additional benefit; it would ensure that programs will be in place during the forthcoming decline in available manpower during the 1990s.

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